AMC2 4W

APC-AMC2-4WCF

BOSCH

en Installation manual

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1 Important Information

Remarks

This hardware is part of a security system. Access should be limited to authorized persons only.

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Germany.

1.1 Explanation of symbols in this document

Throughout this document, helpful tips, important notes, cautions and warnings are presented for the reader. These appear as follows:

WARNING!

These warn the operator of potential damage to the program or equipment.

NOTICE!

Important Notes – must be followed to ensure successful operation and programming. Tips and shortcuts may also be included in such notes.

1.2 Internet

If you are interested in further information on this product or information on other products, please consult our website at http://www.boschsecuritysystems.com.

2 Safety Instructions

NOTICE!
To build an UL approved system refer the documentation contained in the folder titled "_UL" on the delivered CD.

2.1 Important Safety Notes

1. **Read, follow, and retain instructions** - All safety and operating instructions must be read and followed properly before putting the unit into operation. Retain instructions for future reference.
2. **Do not ignore warnings** - Adhere to all warnings on the unit and in the operating instructions.
3. **Accessories** - Use only accessories recommended by the manufacturer or those sold with the product. Accessories not recommended by the manufacturer must not be used, as they may cause hazards.
4. **Installation precautions** - Do not place this unit on an unstable stand, tripod, bracket, or mount. The unit may fall, causing serious injury to persons and damage to the unit. Mount the unit according to the manufacturer’s instructions.
5. **Service** - Do not attempt to service this unit by yourself. Opening or removing covers may expose you to dangerous voltages or other hazards. Refer all servicing to qualified service personnel.

6. **Damage which requires service** - Disconnect the unit from the main AC or DC power source and refer servicing to qualified service personnel under the following conditions:
   - If the power supply cord or plug is damaged.
   - If liquid has been spilled or an object has fallen into the unit.
   - If the unit has been exposed to water and/or inclement weather (rain, snow, etc.).
   - If the unit does not operate normally when following the operating instructions. Adjust only those controls specified in the operating instructions. Improper adjustment of other controls may result in damage, and require extensive work by a qualified technician to restore the unit to normal operation.
   - If the unit has been dropped or the cabinet damaged.
   - If the unit exhibits a distinct change in performance
7. **Replacement parts** - If replacement parts are required, the service technician must use only replacement parts that are specified by the manufacturer. Unauthorized replacements may result in fire, electrical shock or other hazards.
8. **Safety check** - Upon completion of service or repair work on the unit, ask the service technician to perform safety checks to ensure that the unit operates properly
9. **Power sources** - Operate the unit only from the type of power source indicated on the label. If unsure of the type of power supply to use, contact your dealer
   - For units intended to operate on battery power, refer to the operating instructions.
   - For units intended to operate with external power supplies, use only the recommended approved power supplies corresponding to norm EN/UL 60950.
   - For units intended to operate with a limited power source, this power source must comply with EN/UL

60950. Unsuitable replacements may damage the unit or cause fire or shock.
- For units intended to operate at 12V DC normal input voltage is 12V DC. Voltage input must never exceed 15V DC.

10. **Lightning** - For added protection during electrical storms external lightning conductors can be installed. This prevents power surges from damaging the unit.
11. The units should be installed in **locations with restricted access**.

2.2 Safety Precautions

WARNING!

Read instructions!

Before working with the AMC2 device, read these instructions carefully. Make sure you have understood all information described in this document.

WARNING!

Risk of electric shock!

External power supplies must be installed and put into service by qualified personnel. Compliance with the relevant regulations must be ensured.

WARNING!

Risk of damage to equipment!

- Always switch off power of the AMC2 device before modifying the installation.
- Do not connect or disconnect plug connectors, data cables or screw connectors while power is on!

WARNING!

Health and Safety!

Installation of the AMC2 device must comply with any local fire, health and safety regulations. A secured door that may be part of an escape route from an area must be installed with:

- A fail-safe lock (A). So that the door will be released if power fails. Ideally, a magnetic lock should be used.
- A normally-closed break-glass or manual pull (B) in the lock supply wiring, so that in an emergency the fail-safe lock can be immediately powered down.

WARNING!

You must ground the controller. Disconnect both AC and battery power supply before working on the controller.

WARNING!

Risk of damage!

Protect the hardware from electrostatic discharge by observing ESD instructions before unpacking or touching connectors or electronics.

WARNING!

Lithium Battery

Danger of explosion if battery is replaced incorrectly. Replace only with the same type as recommended by the manufacturer. Dispose used batteries according to the battery manufacturer's instructions.

2.3 Unpacking

Check the packaging for visible damage. If anything has been damaged during transport, please inform the transport agency. Unpack the unit carefully. This is an electronic device that must be handled with care to avoid damage. Do not attempt to put the unit into operation if components are damaged.

If any parts are missing, inform your customer service representative or a Bosch Security Systems salesperson. The shipping carton is the safest transport container for the unit. Store it and the other packaging material for future use. If the unit has to be sent back, use the original packaging.

3 Introduction

3.1 Description of the AMC2 4W

The AMC2 4W (also called AMC2 or controller) is equipped with four independent interfaces for Wiegand type readers. It is able to control two doors with a reader in each direction and up to four doors with a reader in one direction only.

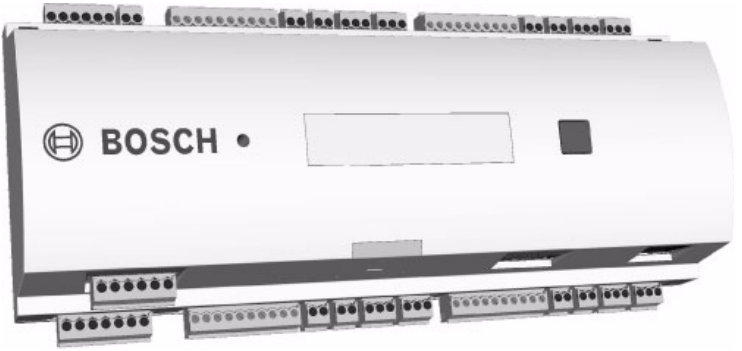


Figure 3.1 The Access Modular Controller AMC2 4W

All necessary information for access verification is stored in a battery buffered on-board memory and a Compact Flash (CF) memory card. This guarantees autonomous access decisions and complete access registrations even if the management host system is offline. The built in compact flash adapter provides adequate storage capability for cardholders and events.

The AMC2 electronics are completely covered by a plastic housing. The liquid crystal display provides all important status information.
Using the AMC2 gives you the full functionality and the offline capability of a complete access control system in each room. This leads to an excellent reliability and a very high redundancy without paying extra money.

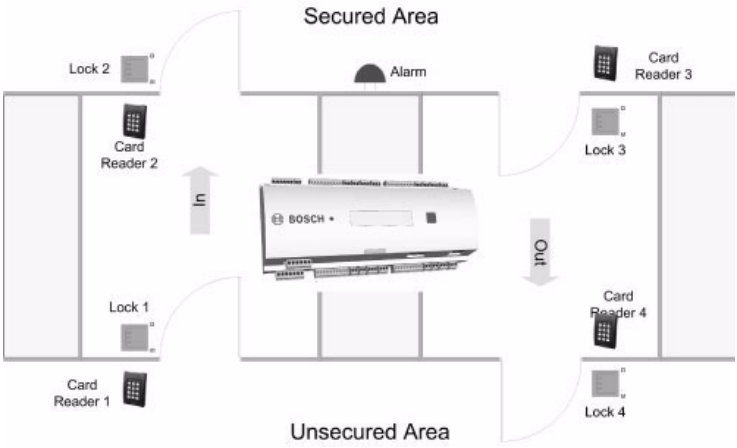


Figure 3.2 The AMC2 4W in a four door safety lock

The AMC2 can communicate upstream to the host computer using RS-485 multi-dropped, RS-232 or 10/100 Mbit/s Ethernet. It has eight analog input devices and eight relay outputs. With its analog input devices, the AMC2 verifies, for example, if a lock is closed or open. The relay outputs can be used to activate lock mechanisms if access is granted, or activate the burglar alarm system if an intrusion or system alert is detected. If the eight inputs and outputs on board are not enough to configure the system, up to three additional extensions (AMC2 8I-8O-EXT, AMC2 16I-EXT, or AMC2 16I-16O-EXT) can be connected. The extensions offer 8 or 16 additional inputs and outputs.

The setup procedure for an AMC2 is made very simple and fast by the use of door templates. Once selected, all the inputs and outputs are predefined. These settings can be changed using the Device Editor (Access Engine) of the BIS Configuration Browser or the Configurator (Access PE) to choose every free contact of the controller or a connected extension.

3.2 Equipment Configuration

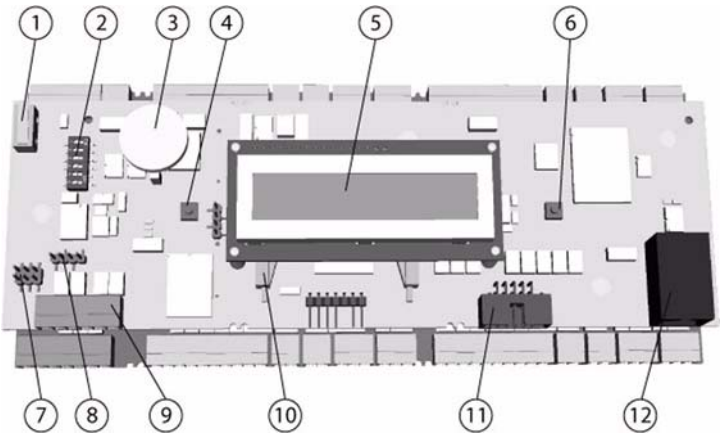


Figure 3.3 Upper circuit board with display (top side)

1. Internal tamper contact
2. DIL switch for RS-485 address selection, protocol and RS-232/RS-485 selection
3. Lithium battery for buffering of static RAM and real time clock (RTC). The battery life is estimated at 10 years, nevertheless an error message is generated if the voltage sinks below a preset minimum level.
4. Reset push button - reachable through the casing using a screwdriver
5. Liquid Crystal Display
6. Push button, available on top of the housing, to select different display modes.
7. Jumper: Equalization of potential between different systems and earth ground (shield)
8. Jumper: Interface selector RS-485 Host connection, RS-485 two wire or RS-485 four wire (depends on external wiring)
9. Configurable RS-485 host interface
10. Docking port for compact flash memory
11. Configurable RS-232 host interface (ribbon cable connector)

12. Configurable 10/100 Mbit/s Ethernet interface

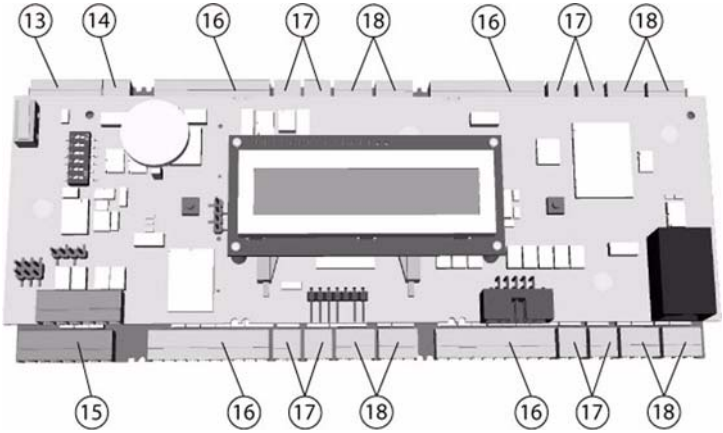


Figure 3.4 Overview - Interfaces

13. RS-485 extension module bus
14. External tamper contact
15. Connector for power supply
16. Wiegand interfaces for up to 4 card readers
17. Connectors for eight analog inputs
18. Connectors for eight relay outputs

NOTICE!
All connectors, with the exception of the RS232 and Ethernet host interface, are pluggable screw clamp terminals.

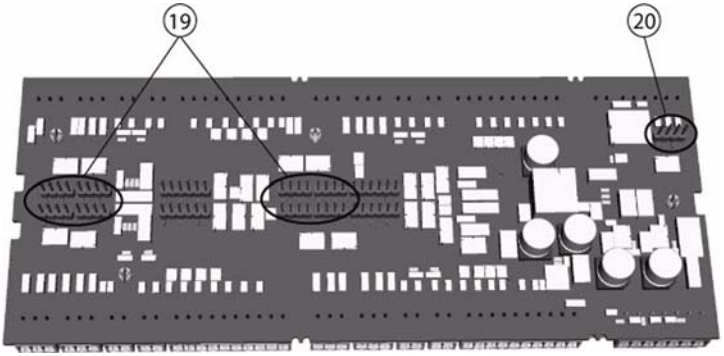


Figure 3.5 Jumper at the bottom side

19. Jumper for setting either voltage free relay output (“dry” mode) or looped-in voltage from the AMC2 internal power supply (“wet” mode).
20. Jumper: Equalization of potential between different systems and earth ground (shield) for the extension interface.

3.3 Performance Characteristics

- Intelligent access manager for 1 ... 4 entrances (for example, doors, man traps, barriers)
- Host address selectable using DIL sliding switch
- Four possible configurable host interfaces:
  - Ethernet
  - RS-485 2-wire
  - RS-485 4-wire
  - RS-232
- Reader interfaces
  - four Wiegand interfaces
- Eight relay outputs
  - voltage free, power is supplied externally (dry mode)
  - powered by internal power supply (wet mode)
- Eight analog inputs with internal power supply
- Battery buffered SRAM and real time clock (RTC)
- Pluggable Compact Flash from 64 MB to 1024 MB
- Liquid Crystal Display
- Transfer rate host interface RS-485: 38,4 kBit/s
- Transfer rate host interface RS-232: 38,4 kBit/s
- Transfer rate host interface Ethernet: 10/100 Mbit/s
- Transfer rate to the extension interface: 9,6 kBit/s
- Self regulating transmit/receive switching
- Power supply: 10 V to 30 Vdc, max. 5 A
- Tamper contact for internal and external covers
- If an external power supply is used then this should be an PBC-60 (F.01U.026.573) with integrated uninterruptable power supply (UPS).

3.4 System Overview

The Access Controller AMC2 4W is connected between the management host system and different peripheral devices. By default, a management host system is connected using Ethernet. A management host connection using RS-485 or RS-232 is also possible. Corresponding to the available interfaces, one AMC2 can be connected to each COM port using RS-232 mode. In RS-485 mode, up to eight access controllers can be combined on one party line.

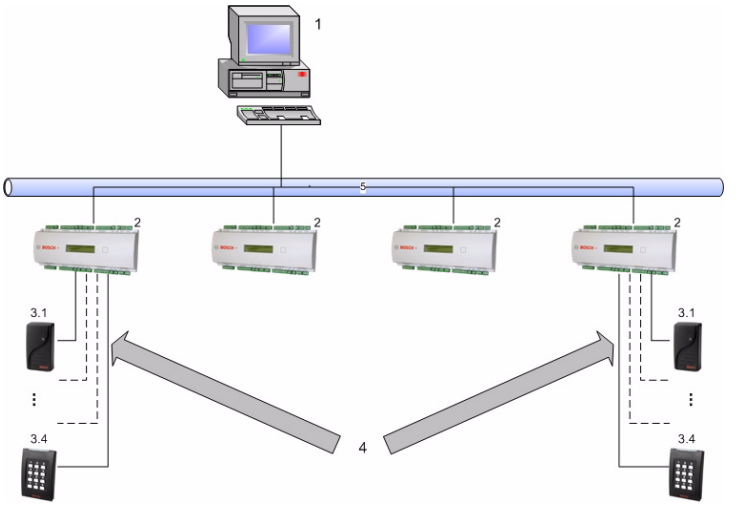


Figure 3.6 System overview

1 = Host
2 = AMC2 4W
3 = Wiegand reader (1 - 4)
4 = Communication and power supply
5 = Ethernet

System Configurations:

- the **minimum** configuration consists of
  - one PC with BIS or Access PE software
  - one AMC2 controller
  - one AMC PBC-60 power supply
  - one AMC enclosure

- the **maximum** configuration consists of
  - up to two PC's with shared BIS software [Access PE = one PC]
  - up to 200 AMC2 controller [Access PE = 64]
  - each controller can be extended with any combination of three AMC2 8I-8O-EXT, AMC2 16I-EXT, or AMC2 16I-16O-EXT input/output modules [Access PE = one extension board]
  - each AMC2 4W controller can be extended with an AMC2 4W-EXT extension module
  - the necessary number of AMC PBC-60 power supplies
  - the necessary number of AMC enclosures

Using an AMC-MUX interface extension on RS485 host connections it is possible to connect up to eight controllers to a single COM port. Up to 200 AMCs can be connected using the ethernet host connection.

Using Wiegand reader interfaces, up to four peripheral devices can be connected to each AMC2.The interfaces are point-to-point connections, meaning that only one reader can be connected to one interface.

The extension interface supports up to three additional I/O boards (AMC2 8I-8O-EXT, AMC2 16I-EXT, or AMC2 16I-16O-EXT) and one AMC2 4W-EXT. All extension boards are controlled by the AMC2 and are freely combinable.

4 Technical Data

Hardware

- Integrated Microcontroller (32 bit, 30 MHz)
- SRAM (256 kB)
- Serial EEPROM
- RTC (real time clock)
- Pluggable Compact Flash from 64 MB up to 1 GB
- Battery for SRAM and RTC
- DIL switch for host settings (address and protocol mode)
- Host interfaces
  - Ethernet 10/100 Mbit/s
  - RS-485 2-wire or 4-wire
    Transfer rate: 38,4 kBit/s
    (even parity, 7 bit, 1 stop bit)
  - RS-232
    Transfer rate: 38,4 kBit/s
    (no parity, 8 bit, 1 stop bit)
- Four Wiegand interfaces for up to four card readers
  (Output rating: 280 mA)
- Eight relay outputs
  - maximum ratings:
    switching voltage: 30 Vdc
    switching current: 1,25 A
  - operating ratings:
    1,25 A @ 30 Vdc
    2 A @ 12 Vdc
    1,5 A @ 24 Vdc
- Eight analog inputs with sabotage monitoring; only connect dry contacts
- RS-485 extension interface:
  Transfer rate: 9,6 kBit/s
  (no parity, 8 bit, 2 stop bit)
- Tamper contact for enclosures

Power supply

10 to 30 Vdc

Display
64,8 mm x 13,9 mm (2.551 x 0.547 in.)
1 line, 16 characters

Power consumption
AMC: 5 VA
Peripheral devices: using the PBC-60
- up to 55 VA
- constant load: 25 VA

Connectors
Pluggable screw connectors

Protection class
IP30

Environment temperature
0° C to 45° C (32° F to 113° F)

Humidity
Up to 95%, without condensation

Housing material
ABS with OC (UL 94 V-0)

Dimensions
(W/H/D) 232mm x 90mm x 63mm (8.9 x 3.5 x 2.4 in.)

Weight
app. 0,53 kg (0.9 pounds)

WARNING!
The voltage drop from the power supply to the AMC has effect on the AMC interfaces. Their sum must be less than 2 V!

NOTICE!

Using several devices in an installation system take care about the greatest minimum and the lowest maximum value for the environment. Take these for the system limits.

5 Installing

NOTICE!
To build an UL approved system refer the documentation contained in the folder titled "_UL" on the delivered CD.

5.1 Mounting

The AMC2 can be attached on a standard 35 mm (1.377 in.) mounting rail using a snap-in mechanism. Attach the AMC2 into the upper edge of the mounting rail [**1**], then push down the device and snap it onto the rail by pushing it towards the back [**2**].

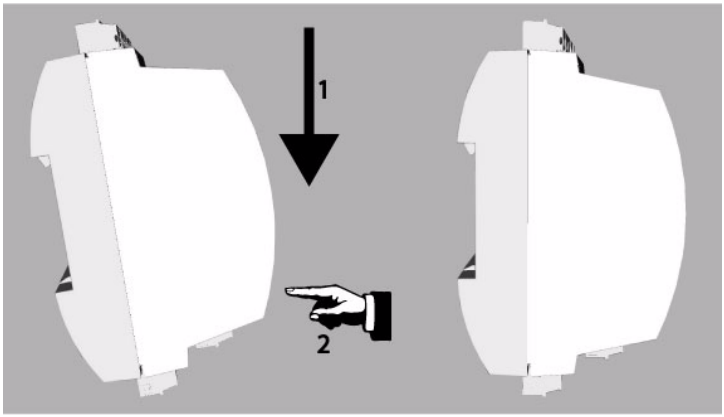


Figure 5.1 Mounting the AMC2 on a mounting rail

5.2 Unmounting

NOTICE!
To remove the AMC2 from a mounting rail, first, remove all pluggable connectors.

Push down the AMC2 until the lower edge snaps out of the mounting rail [**1**]. Pull the lower end of the AMC2 from the mounting rail [**2**].

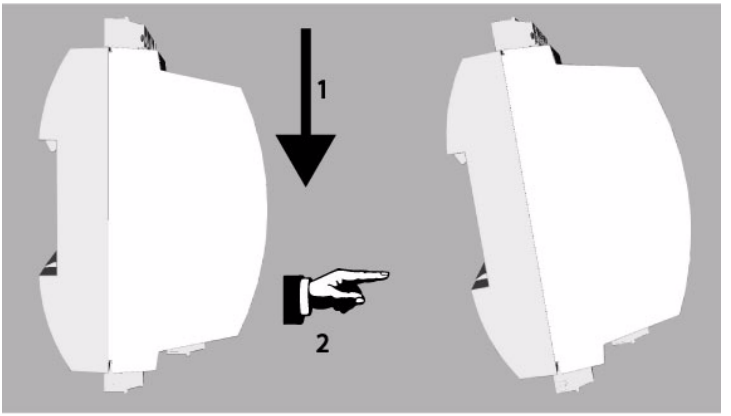


Figure 5.2 Unmounting the AMC2 from a mounting rail

5.3 Opening the Case

NOTICE!
To open the AMC2, first remove all pluggable connectors.

The AMC2 case consists of a top cover mounted with a two-point snap-in closure on a chassis. To open the case, push down the two snap-ins with a screwdriver, then swing the cover down.

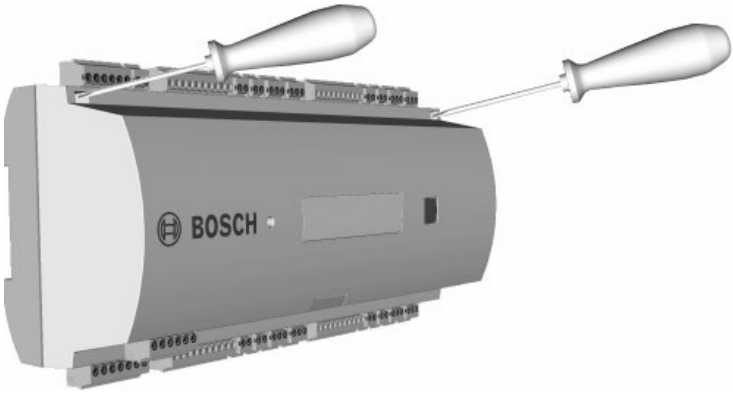


Figure 5.3 Opening the AMC2 case

5.4 Closing the Case

Before aligning the covers, unplug any pluggable screw connectors. Insert the hooks on the lower edge of the front cover into the lugs on lower edge of the plastic back cover [**1**]. Please ensure that the BOSCH logo is not upside-down. The upper edge of the front cover now aligns with the two-point snap-in closures on the upper edge of the back cover [**2**], and may thus be clicked gently into place.
Hence the closing process is the reverse of the opening process.

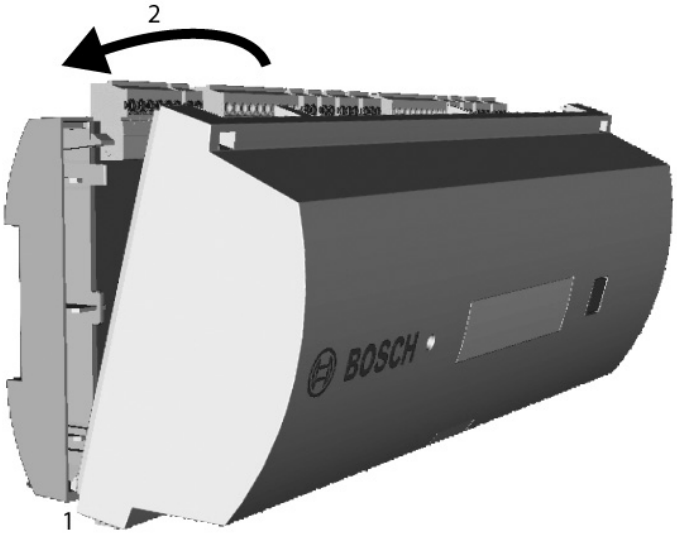


Figure 5.4 Closing the case

NOTICE!
If excessive force is required to close the front cover then it is probably incorrectly hooked into the back cover. In such cases the display 'Dialog' button in the front cover will be misaligned and will not function correctly.

5.5 Cabling

WARNING!
The cables used in the AMC2 access control system are not prone to electrical interference. However, you should avoid routing cables close to heavy load switching cables and equipment. If this is unavoidable, cross the cable at right angles every 1 to 2 m (3 to 6 ft) to reduce interference.

5.5.1 Conductor data

With the calculation below you can find out which cable type must be used. If you connect the power supply and the AMC-device with the delivered cable set from the enclosure the calculation is not necessary.
For distances below 25 m (75 ft) use AWG18 conductors (1mm²). For longer distances, install an additional power supply close to the AMC2 controller.
Please, calculate the voltage drop by checking the conductor specifications for characteristic resistance values. The voltage drop shall not exceed 2 V.
Example:
Length = 100 m/328 ft
U = 12V, I = 1A, maximum U_{Drop} = 2V

i.e. RAWG18 (acc. specs) = 6.385 $\frac{\Omega}{1000\ ft}$ or 20,948 $\frac{\Omega}{km}$

U_{Drop} = 20,948 $\frac{\Omega}{km}$ x 0.1 km x 1A = 2.1V

U_{Drop} = 6.385 $\frac{\Omega}{1000\ ft}$ x 328 ft x 1A = 2.1V

Critical condition! Install the power supply closer to the controller.

NOTICE!
These specifications apply to power supply, readers, relay outputs, and extension interface.
Regarding inputs, specific voltage-drop values need to be taken into account. Refer to *Table 5.3*

5.6 Grounding and Shielding

The main grounding point at the AMC2 is connected to pin 2 of the power supply connector - see *Table 7.3*.
It is good practice to shield all wires carrying low level signals.

The AMC2 allows you to create a central ground or shielding point, simply by setting certain jumpers. Set these jumpers only if grounding or shielding is not achieved by other means.

NOTICE!
In general the following apply:

- If the devices have their own power supplies, the shielding is applied to one side only.
  The free end should be insulated to avoid inadvertent connections.
- If one device is fed power by another, the cable shielding should be applied to both sides.

WARNING!
Please ensure that no ground loops are formed.

5.6.1 Host Interface

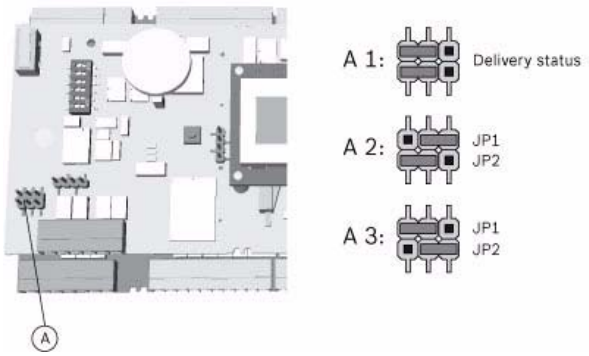


Figure 5.5 Location of ground jumper RS-485 host interface

The jumper setting A1 shows the factory settings.

Jumper JP1 connects the internal ground of the AMC2 4W to the ground of the RS-485 host interface.
Jumper JP2 manages the signal ground.

Settings for jumper JP1:
If the ground conductor and the shield on the host are not connected and ...

- no party line exists, the jumper JP1 is set (= A2)
- a party line exists, the jumper JP1 is set at the first device, only (= A2)

Settings for jumper JP2:
If the ground conductor and the shield on the host are not connected and ...

- no party line exists, the jumper JP2 is set (= A3)
- a party line exists and signal ground is connected, the jumper JP2 is set at the first device, only (= A3)
- a party line exists and signal ground is not connected, the jumper JP2 is set at all devices (= A3)

NOTICE!
If the AMC2 is set to RS-232 mode, set jumper JP1 (= A2).

5.6.2 Extension Interface

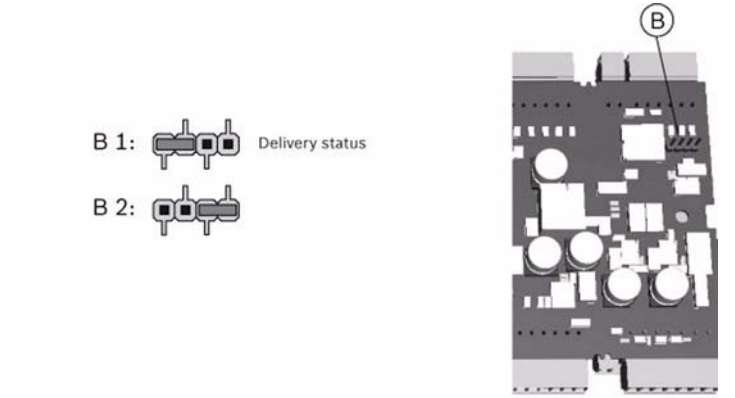


Figure 5.6 Location of ground jumper bottom side

Jumper B connects the internal ground of the AMC2 to the RS-485 ground of the slave interface. Only set jumper B (B2) if the AMC2 powers all other peripheral devices directly connected to it.

5.7 Connecting Power Supply

Connect the power supply to the POWER 7-pin pluggable screw connector on the upper case. Refer to *Table 7.3* for a complete diagram.

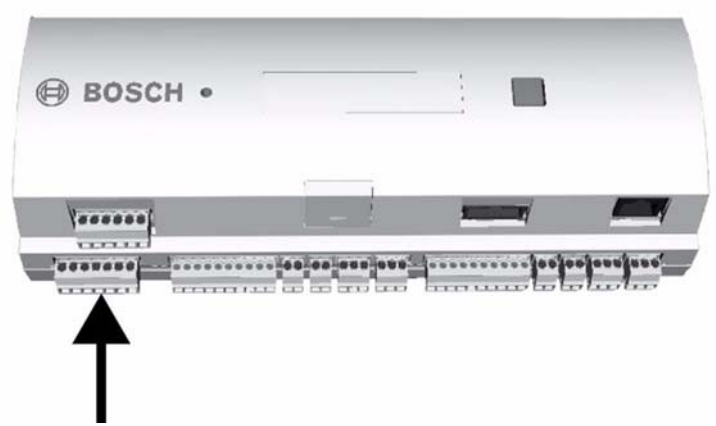


Figure 5.7 Location of the power supply connector

Connect an external power supply (10 - 30 Vdc) for the AMC2 device at pin 1 (positive) and pin 3 (negative) of the pluggable screw connector.

If an uninterruptible power supply (UPS) is used, the relay output for power good signals from the UPS is connected to the following pins:

- pin 4 and 7 for power good AC
- pin 5 and 7 for power good Battery
- pin 6 and 7 for power good DC

Otherwise these pins must be short-circuited.

5.8 Ethernet Interface

The AMC2 offers a 10/100 Mbit/s Ethernet auto-sensing interface to connect to a local area network or host computer.

NOTICE!
Use either a CAT5 crossover cable to connect the AMC2 directly to host computer, or a standard CAT5 patch cable to connect the AMC2 via a network.

A complete connection diagram of the Ethernet host interface is shown in *Table 7.2*.

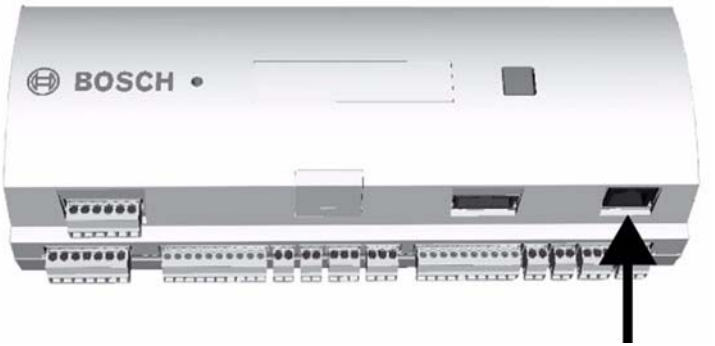


Figure 5.8 Location of the Ethernet interface

NOTICE!
After connecting a new AMC2 device to a network using DHCP, it can take some time before the new AMC2 device is recognized by the remote server.
You can accelerate this process by running the following command:
ipconfig /flushdns
This makes the AMC2 device immediately available by its name.

5.9 RS-485 Host Interface

An RS-485 host system can consist of up to eight AMC2 controllers connected using 2- or 4-wire connection.

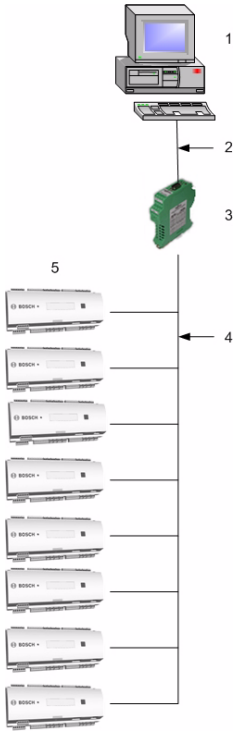


Figure 5.9 Configuration of a RS-485 host system

1 = Host
2 = RS-232 connection
3 = AMC-MUX - converter
4 = RS-485 bus
5 = AMC2 controller

The following conditions apply for an RS-485 bus system:

- A bus system consists of a bus line and/or one or more branch lines.
- Cable lengths exceeding 100 m (300 ft) must be installed as bus lines.
- Branch lines are branching connections from a bus line.

- Peripheral devices are AMC2 which are connected to the host computer.
- Maximum cable length of a bus line must not exceed 1200 m (4000ft).
- The cable length of branch lines must not exceed 100m (330ft).
- Any bus line conductor connects up to eight AMC2. Do not exceed the maximum number of devices.
- For longer bus lines connect the AMC2 to multiple AMC-MUX (-EXT) with the host.

NOTICE!

Up to seven AMC-MUX-EXT can be connected to an AMC-MUX. Every module is subject to the conditions above. Even when using extension modules the maximum number of AMC2's which can be connected is eight.
For more information about the AMC-MUX and AMC-MUX-EXT please consult their respective installation guides (Order number F.01U.012.855).

To use RS-485 mode at the AMC2, connect the data cables to the pluggable screw connector of the RS-485 host interface. Set the connection mode of the RS-485 using the DIL switch of the AMC-MUX. Then set the RS-485 address using DIL switch and activate the RS-485 two-wire or four-wire mode using jumper settings on the AMC.
For connection diagrams and settings refer to *Figure 5.12* and *Figure 5.14*.

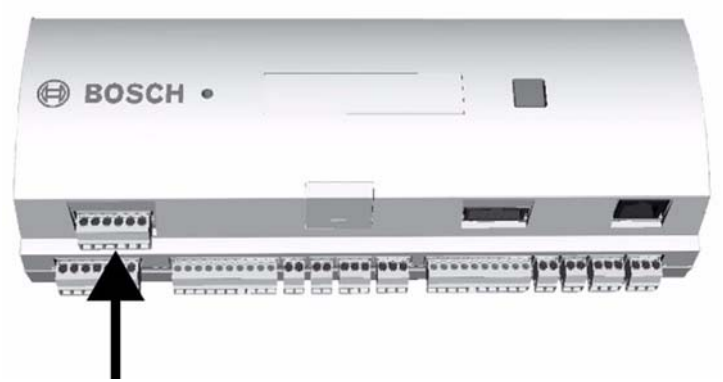


Figure 5.10 RS-485 host interface

5.9.1 RS-485 Two Wire Connection

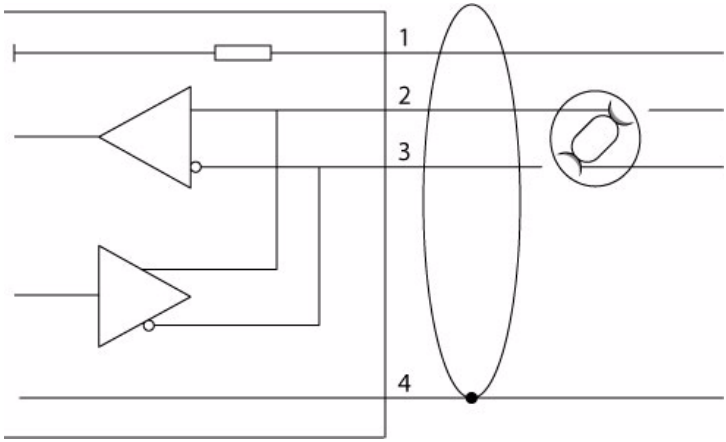


Figure 5.11 Connection scheme of a RS-485 two wire connection

1 = signal ground
2 = TxRx+
3 = TxRx-
4 = shield

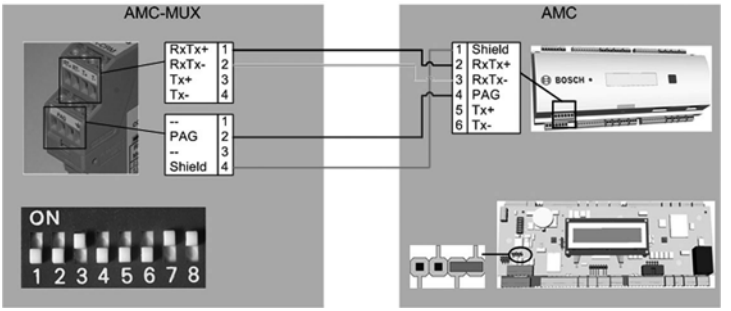


Figure 5.12 Settings for RS-485 two wire connections

For RS-485 two wire connection, set the AMC-MUX DIL switch at positions **3**, **7** and **8** to **ON**.
On the upper side of the AMC panel, put the jumper on the two pins on the right hand side of connector **8**. Also refer to *Figure 3.3*.
Set the RS-485 address of the AMC2 controller using the DIL switch. Refer to *Section 5.11 DIL switch selector*.

5.9.2 RS-485 Four Wire Connection

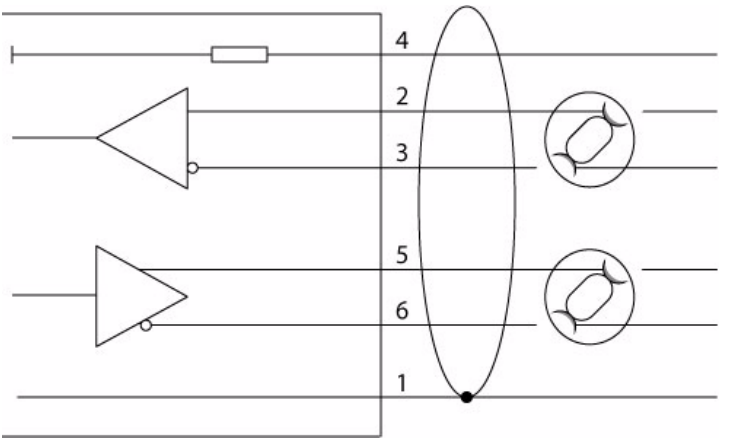


Figure 5.13 Connection scheme of an RS-485 four wire connection

1 = shield
2 = TxRx+

3 = TxRx-
4 = signal ground
5 = Tx+
6 = Tx-

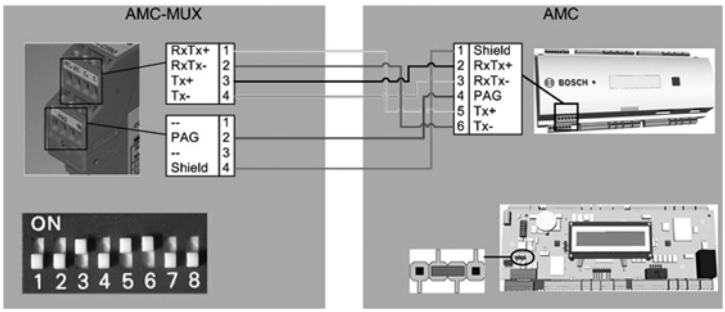


Figure 5.14 Settings for RS-485 four wire connection

For RS-485 four wire connection, set the AMC-MUX DIL switch at positions 3, 5 and 6 to ON. On the upper side of the AMC panel, put the jumper on the two pins on the right hand side of the connector 8. Also refer to *Figure 3.3*. Set the RS-485 address of the AMC2 controller using the DIL switch. Refer to *Section 5.11 DIL switch selector*. A complete connection diagram of the RS-485 host interface is shown in *Table 7.1*.

5.10 RS-232 Host Interface

The AMC2 offers an RS-232 serial interface to connect a host computer or serial modem.

WARNING!
Cable length between two RS-232 COM serial interfaces must not exceed 15 meters (45 ft).

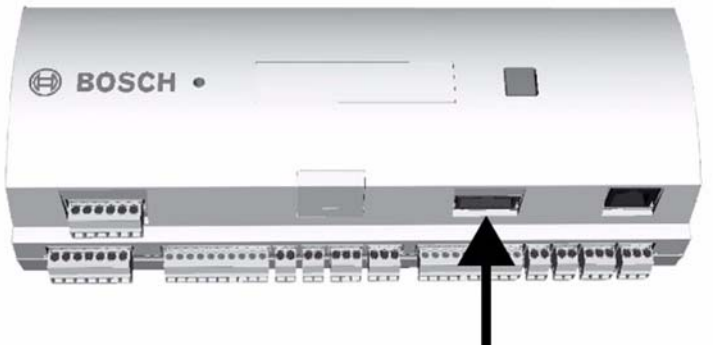


Figure 5.15 Location of the RS-232 serial interface

As the AMC2 controller is conceptionally a PC, it is not possible to connect them directly using normal cables. Use instead a null modem or “crossover” cable. A complete connection diagram of the RS-232 host interface is shown in *Figure 7.2*.

5.11 DIL switch selector

DIL switches are used to configure the host settings. The first **four** DIL switches for address selection define the RS-485 address of the AMC2 in a RS-485 bus system. Switch **5** selects one of the two different protocols, SDEB and BPA (according to DIN6619). Switch 6 sets the connection to the host system to either RS-232 or RS-485.

NOTICE!

If using an Ethernet connection, set switch 1 to ON (= factory setting).

If using an RS-232 connection, set the address by configuring it in the Access Control System (ACE Device Editor or Access PE Configurator). This is a point-to-point connection that is usually configured as address 1, so set switch 1 to ON.

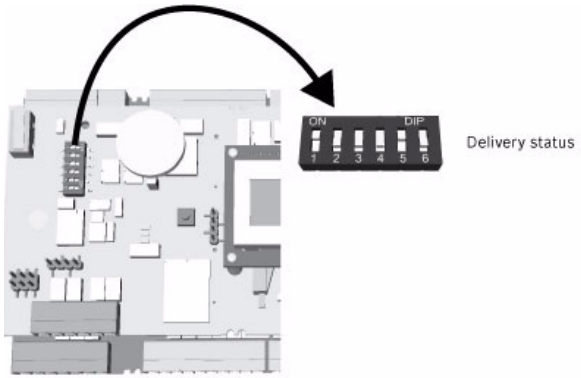


Figure 5.16 Location of the selector for host settings

	DIL Switches			
Address	**1**	**2**	**3**	**4**
none	OFF	OFF	OFF	OFF
1	**ON**	OFF	OFF	OFF
2	OFF	**ON**	OFF	OFF
3	**ON**	**ON**	OFF	OFF
4	OFF	OFF	**ON**	OFF
5	**ON**	OFF	**ON**	OFF
6	OFF	**ON**	**ON**	OFF
7	**ON**	**ON**	**ON**	OFF
8	OFF	OFF	OFF	**ON**

Table 5.1 Setting the address via the DIL switch

Mode	**DIL Switches**	
	5	**6**
ON	SDEB	RS-232
OFF	BPA	RS-485

Table 5.2 Protocol and connection settings

5.12 RS-485 for extension modules

The RS-485 Extension Module Bus expands the AMC2 4W with additional I/O modules (AMC2 8I-8O-EXT, AMC2 16I-16O-EXT, or AMC2 16I-EXT) and/or with the reader interface extension AMC2 4W-EXT.

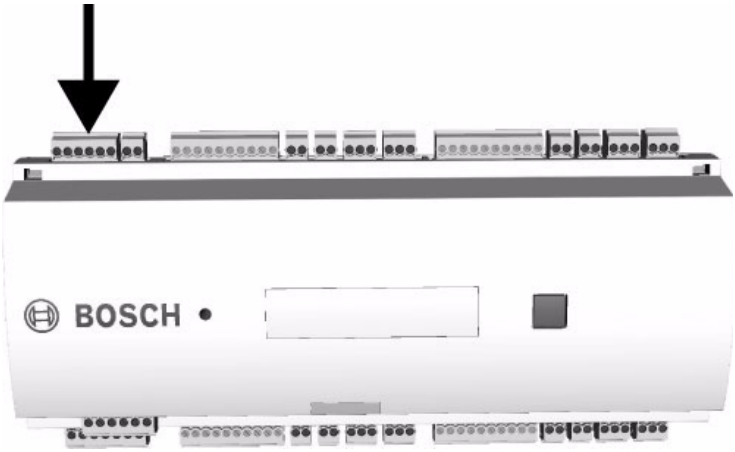


Figure 5.17 Location of the RS-485 extension module bus

Up to three expansion modules can be connected to provide additional in- and outputs, for example, for elevator control. You can find further information about the extension boards in their installation manuals.
A complete connection diagram of the RS-485 extension module bus is shown in *Table 7.7*.

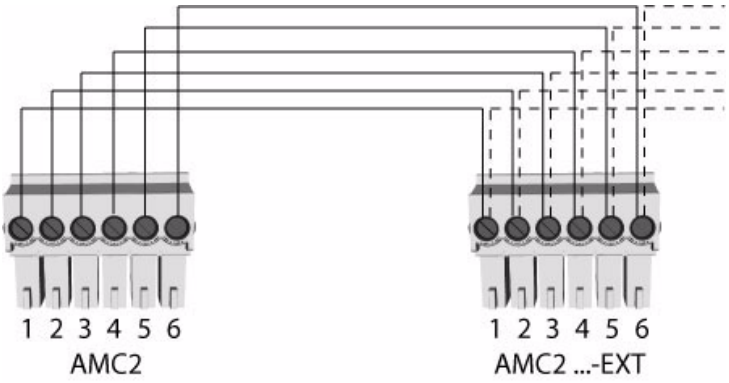


Figure 5.18 Connection of an extension modul to an AMC2

5.13 Wiegand Interface for Card Readers

The AMC2 4W provides four ports for connecting a maximum of 4 readers with Wiegand interfaces. Each interface is connected using a 10-pin pluggable screw connector (S2, S7, S14, and S19) - refer to *Figure 7.3*.

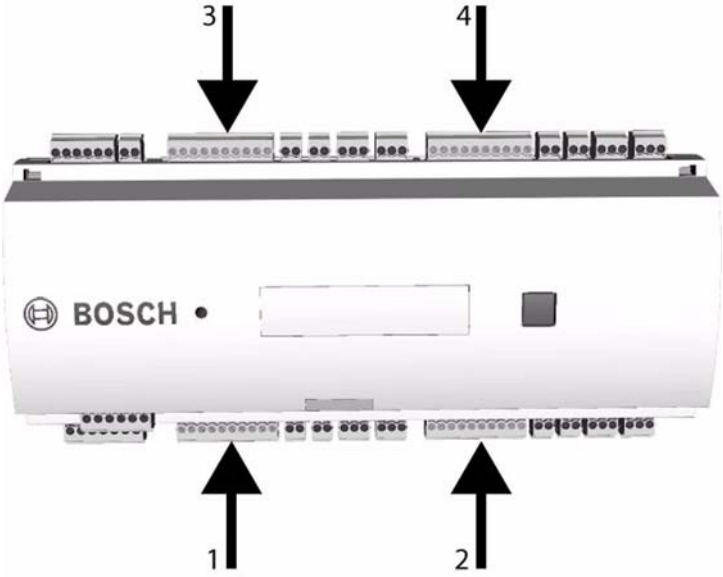


Figure 5.19 Location of the Wiegand interfaces for external devices

These interfaces are point-to-point connections, and each can support only a single reader with a maximum cable length of 150m (492 ft). Readers are addresssed according to their respective interface numbers.
Refer to *Table 7.4* for a complete wiring diagram of the Wiegand reader interface.

5.13.1 Connecting different reader types

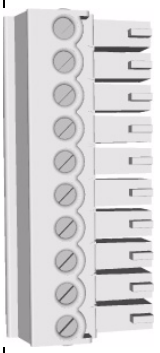
Connection schemes and reader wiring colors vary from type to type, and so may differ from the 10-pole Wiegand to AMC connection shown in the appendix (*Table 7.4*)

NOTICE!
If your reader requires a voltage other than 12V then it will require an external power supply.

Wiegand reader type W 1

This wiring diagram refers to the following readers from the BOSCH catalog:

CTN	Part Number
ARD-ProxPointPlus	4.998.141.821
ARD-MiniProx	4.998.141.822
ARD-Prox80	4.998.141.823
ARD-R10	4.998.127.612
ARD-R30	4.998.127.613
ARD-R40	4.998.127.614
ARD-RK40-AMC01	F.01U.514.655



1	red	Reader Supply - 12V+
2	black	Reader Supply - 0V
3	green	Data 0
4	white	Data 1
5	drain	Shield
6	orange	green LED
7	brown	red LED
8	yellow	Beeper
9	blue	Hold
10	violet	Card Present

NOTICE!

The terminal assignment shown above does not apply to the W1 readers ARD-R90-AKT00 (F.01U.030.232) and ARD-R90 (F.01U.027.003). Please use instead the installation guide of the card reader itself.

The Wiegand reader interface of the the AMC2 4W does not provide sufficient power for the ARD-R90. Please plan an external power supply for the ARD-R90.

Wiegand reader type W 2

This wiring diagram refers to the following readers from the BOSCH catalog:

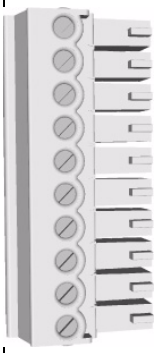
CTN	Part Number
ARD-P0834-01	F.01U.028.449
ARD-H0834-01	F.01U.028.448
ARD-W2626-01	F.01U.028.443
ARD-W2634-01	F.01U.028.444
ARD-Prox26-01	F.01U.028.446

1	red	Power supply - 12 V+
2	black	Reader Supply - 0V
3	green	Data 0
4	white	Data 1 (clock)
5	purple	shield
6	brown	green LED
7	-	
8	-	
9	-	
10	-	

NOTICE!
The beeper will be controlled by the reader.

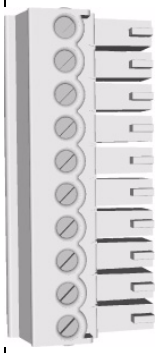
Wiegand reader type W 3
This wiring diagram refers to the following readers from the BOSCH catalog:

CTN	Part Number
ARD-AYK12	F.01U.075.408
ARD-AYJ12	F.01U.075.388
ARD-AYH12	F.01U.075.389
ARD-AYQ12	F.01U.075.390
ARD-AYCE65B	F.01U.075.391



1	red	Power supply - 12 V+
2	black	Reader Supply - 0V
3	green	Data 0
4	white	Data 1 (clock)
5	-	
6	brown	green LED
7	-	
8	-	
9	-	
10	purple	Card present

Wiegand reader type W 4



1	green LED
2	red LED
3	Data 0
4	Data 1
5	-
6	Reader Supply - 0V
7	Reader Supply: 8 - 30VDC
8	-
9	-
10	-

The reader has an additional DIL switch to choose the following parameter settings.

S1 =	on	The beeper is controlled by input 1.
S2 =	on	The beeper will allways be set after card reading.
S3 =	on	The LED displays will be controlled by the reader.
S4 =	off	
S5 =	on	The beeper is controlled by input 2.

NOTICE!
In the default delivery status pin 2 is set to ON.

5.14 Connecting Relay Outputs

To operate locks or alarm systems, the AMC2 has eight form C relay outputs. The outputs will be connected to the 3-pin pluggable screw connectors: S5, S6, S10, S11, S17, S18, S22, and S23 - refer to *Table 7.6*.

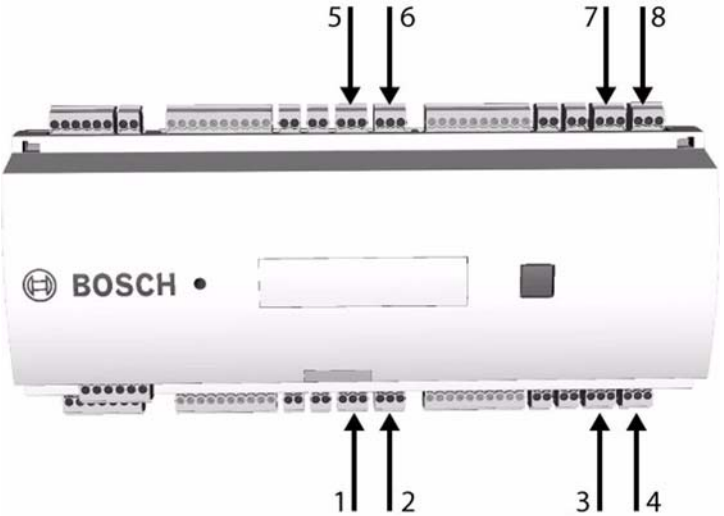


Figure 5.20 Location of the relay output connectors

Each relay output can operate in ‘wet’ mode, using the AMC2's internal 12Vdc power supply for external devices or ‘dry’ mode with potential free contacts for externally powered systems.

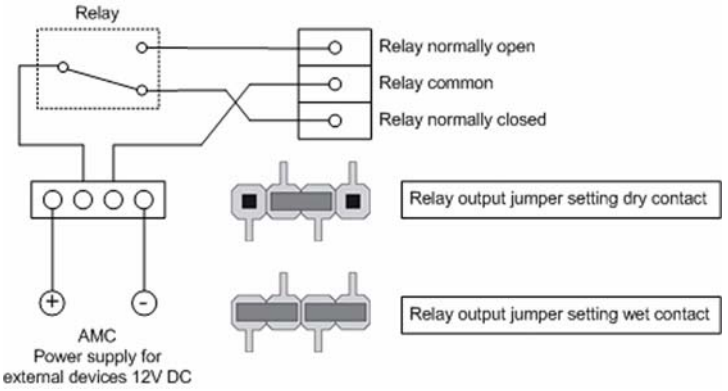


Figure 5.21 Wet mode and dry mode of the AMC2 relay outputs

WARNING!
Please note the following specifications.

To prevent damage to the relays please remember:

- the maximum switching current is 1.25 A
- the maximum switching voltage is 30 Vdc
- only ohm resistive load can be connected to the relay
- inductive loads have to be short circuited using recovery diodes - refer to *Figure 5.22*. These diodes (1N4004) are supplied with every AMC2 package.
- If you need higher voltage for special applications you can connect external relays to the outputs. Recommended, depending on the power supply mode, are the relay types from the Wieland company:
  - Flare move 12DC1W10A
  - Flare move 24DC1W16A

If using locally manufactured products, please ensure that the specifications of the product are identical with the those listed above.

A complete connection diagram of the relay output connectors is shown in *Table 7.6*.

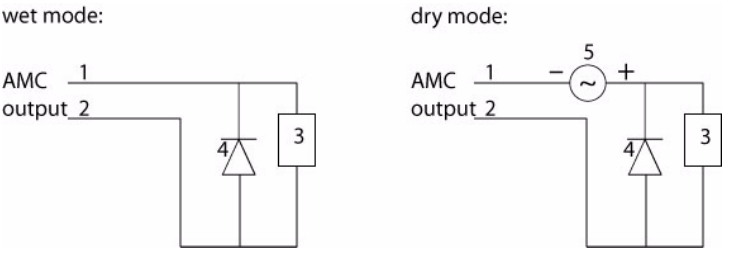


Figure 5.22 Recovery diode schematic

1	normally open/ normally closed
2	common
3	load
4	diode

1	normally open/ normally closed
2	common
3	load
4	diode
5	voltage source

WARNING!
Risk of Damage!
Do not connect externally powered devices in wet mode. This can damage the AMC2.

Each relay output has a separate jumper setting on the underside of the circuit board to select wet (D 2) or dry (D 1) mode.

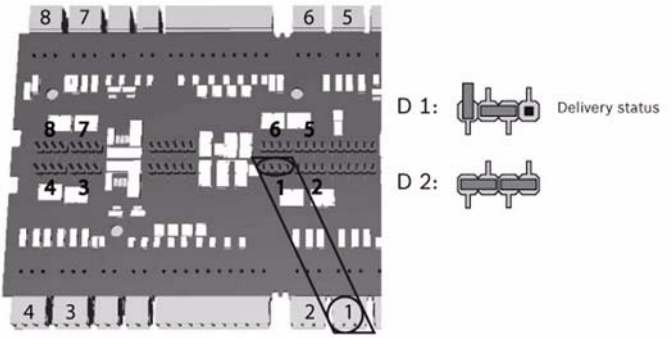


Figure 5.23 Location of relay output jumpers (bottom side)

NOTICE!
The positions of the jumpers 1 and 2 are interchanged related to the corresponded interfaces.

5.15 Connecting Analog Input Devices

The AMC2 has eight analog inputs, for example, for potential-free lock mechanisms, or to detect whether a lock is closed or open. The inputs will be connected to the 2-pin pluggable screw connectors: S3, S4, S8, S9, S15, S16, S20, and S21 - refer to *Table 7.5*.

WARNING!
Risk of damaging equipment.
Do not connect external power supply to the AMC2 controller inputs.
When connecting a relay output to an AMC2 controller input use dry mode with potential-free contact - refer to *Figure 5.21*.

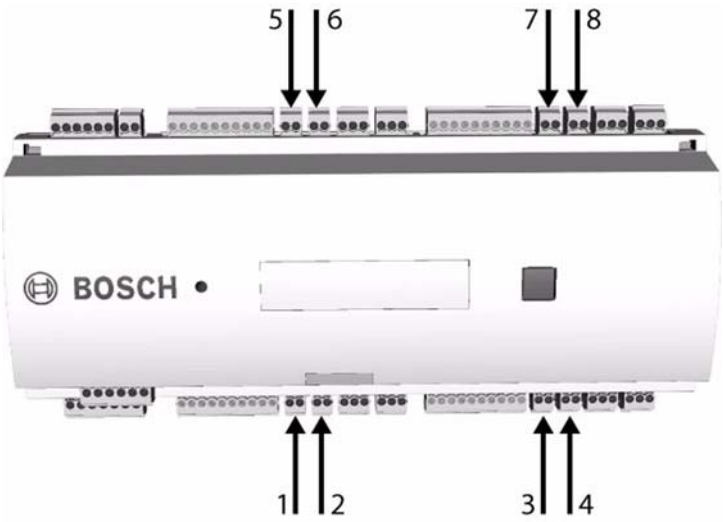
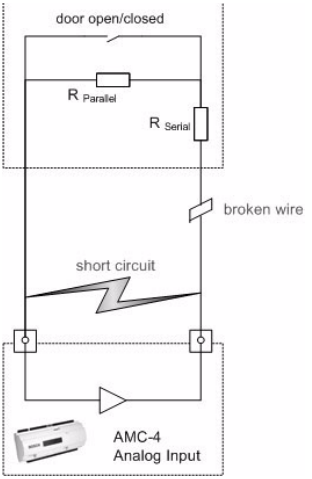


Figure 5.24 Location of the analog input connectors

The AMC2 can also detect the wiring conditions ‘short circuit’ and ‘broken’, and hence trigger an alarm if the appropriate devices are connected.



1. Door open: $R_S + R_P$
2. Door closed: R_S
3. Open wire: $R_S + R_P = \infty$
4. Short circuit: $R_S + R_P = 0$

The resistor values can vary and depend on the used lock system.

The extension package includes 2,2 kΩ resistors which can be used to replace RS and RP resistor.

To detect the four states, the voltage drop in the connecting cable may not exceed special values. The following table shows the maximum values of permissible cable resistance depending on the used resistor combination.

R_P / R_S	1k	1k2	1k5	1k8	2k2	2k7	3k3	3k9	4k7	5k6	6k8	8k2
1k	220	220	220	210	200							
1k2	260	270	270	270	260	240						
1k5	310	330	340	350	350	340	310	280				
1k8	340	380	390	410	410	410	400	370	330	290	200	
2k2		430	460	490	510	520	510	500	460	420	340	240
2k7		490	540	570	620	630	640	640	620	580	510	420
3k3			610	650	700	740	770	780	770	750	700	620
3k9				720	790	850	890	910	910	910	880	810
4k7					880	960	960	970	1100	1100	1050	1050
5k6						1050	1100	1200	1200	1300	1300	1250
6k8							1300	1400	1500	1500	1500	1500
8k2								1500	1650	1700	1800	1900

Table 5.3 Maximum values of cable resistance per used resistor combination in Ohm

NOTICE!
We recommend using serial resistors (R_S) no higher than 5K6 in order to obtain clear measurements.

5.16 Tamper Protection

To protect the AMC2 against unauthorized access and so prevent tampering with sensitive data, the AMC2 provides an additional interface to connect external tamper contacts. This interface is a potential-free 2-pin pluggable screw connector marked with **T**. When not in use this tamper contact should be shorted.

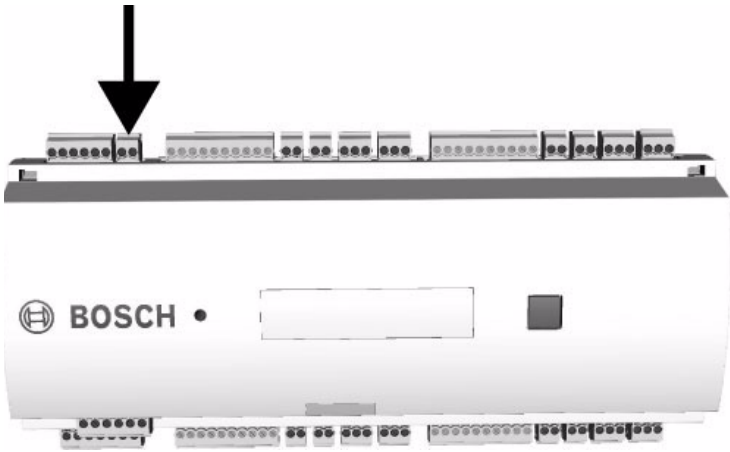


Figure 5.25 Location of the tamper protection contact

6 Operating

6.1 Status Display of the AMC2 4W

The liquid crystal display delivers status information about the AMC2. Push the 'Dialog' button to switch between different modes.

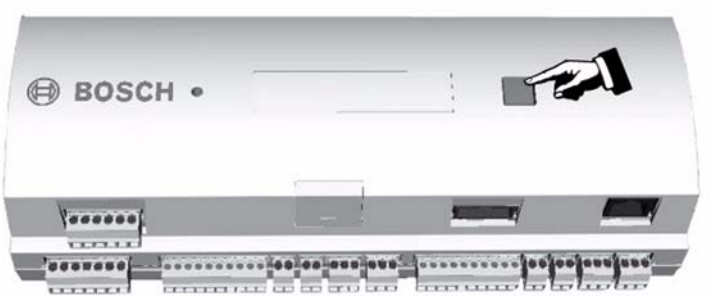


Figure 6.1 Location of the 'Dialog' button

The selected display mode remains set until the next time the button is pressed. The order of the display pages is shown in the following table.

Push	Display (Example)	Description
0	V01.00 02.03.07 or WIEGAND	Software versions and date of the downloader - every 5 sec. alternating with the display of the reader interface. (= default page)
1	99999876543210 A	BOSCH serial number and bus address: A = address 1 ... H = address 8
2	02.06 15:35:15	Current date and time

Push	Display (Example)	Description
3	Dig. IO: ::::::::::::::::	Display of the digital contacts: the input signals set will be shown with an extension above - output signals with an extension below.
3a	Dig. I1: ::::::::::::::::	If there are I/O-Boards connected the signals will be shown on separate pages.
3b	Dig. I2: ::::::::::::::::	
3c	Dig. I3: ::::::::::::::::	
4	MAC 0010174C8A0C	Network device address (MAC)
5	N AMC-1234-5678	Network name of the AMC2
6	I 192.168.10.18	IP-address of the AMC2
7	G 192.168.10.255	IP-address of the gateway (Version V 00.44 or higher)
8	M 255.255.255.0	Subnetmask (Version V 00.44 or higher)
9	H 192.168.10.10	IP-address of the host computer
10	DHCP 1	DHCP-status: 1 = on 0 = off
11	D 192.168.10.1	IP-address of the DNS server
12	Host: + "C"	Host activity: + = online - = offline "C" = Counter of the received data packages from the host interface.

6.2 Configuring the Ethernet Interface

To configure the AMC2 in a TCP/IP network environment, use the **AmcIpConfig** tool provided in the following directory on the standalone or the remote server of the **Building Integration System**:
\\Runtime-drive:\MgtS\AccessEngine\AC\bin

The access control system **Access Personal Edition** has an entry of this tool in its program folder:
Start > Programs > Access Personal Edition > AmcIpConfig
This tool can be copied and used on every computer on the network.

CAUTION!
Use only alphanumeric characters plus the seperator "-" (minus/dash).
The network name has to start with a letter. Do not use special characters or spaces.
The names are **not** case sensitive.

NOTICE!
Please consult the AmcIpConfig tool's own online help for details on configuring the AMC2.

6.3 Resetting the AMC2 4W

If problems occur, they should first be tackled directly - for example check the Network connection, IP-address and DIL switch settings. Nevertheless it is sometimes an indirect help to reset the AMC2 unit to its factory defaults.

6.3.1 Resetting the Software

1. Insert the provided screwdriver into the hole until it reaches the reset button as shown in *Figure 6.2*.
2. Press the reset button for at least three seconds.
3. The AMC2 deletes its application program leaving only its bootloader and network setting.

As soon as it is online again, the AMC2 bootloader will download a fresh copy of the application program and configuration. If the problem persists please request technical support.

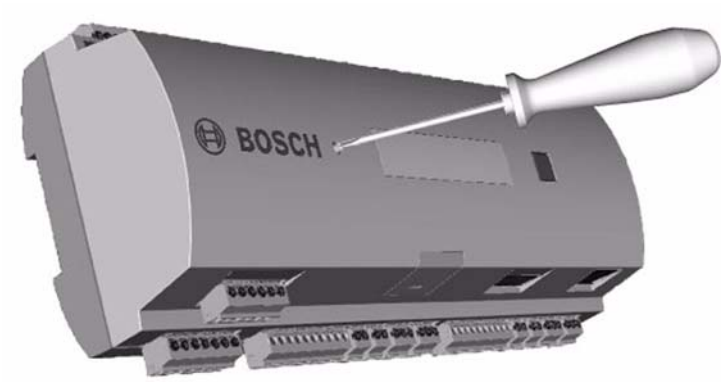


Figure 6.2 Resetting the AMC2

6.3.2 Resetting the Network Configuration

1. Reset the AMC2 as described above.
2. Open the upper case of the AMC2 as described in *Section 5.3 Opening the Case*.
3. Set all six DIL switches of the RS-485 selector to **ON** as shown in *Figure 6.3*.
4. Press the tamper switch on the upper left side of the board.
5. Set the DIL switches back in the address state before resetting.

The AMC2 now has the following network configuration:

– DHCP = 1
– IP = 0.0.0.0
– Subnet mask = 0.0.0.0

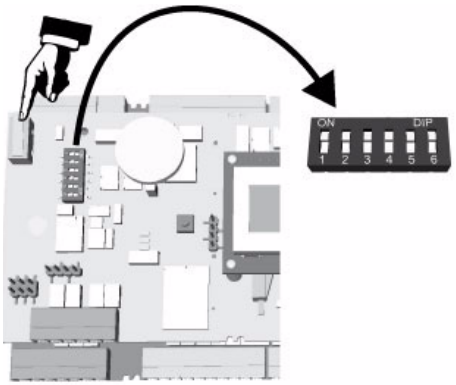


Figure 6.3 Resetting the AMC2 to delivery state

7 Appendix

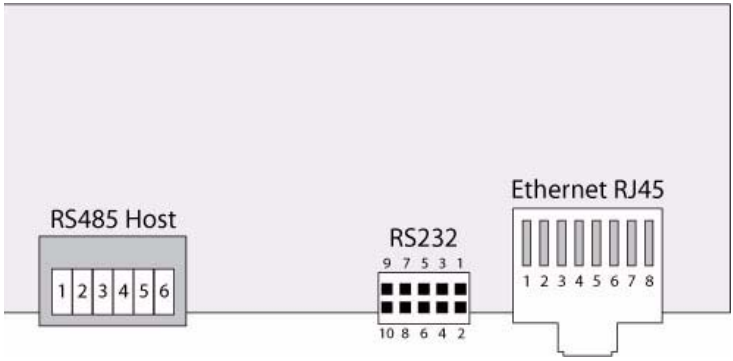
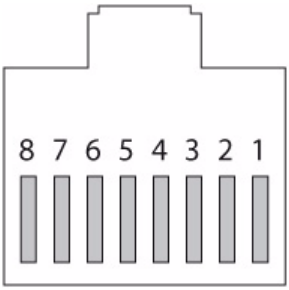


Figure 7.1 Connectors on upper PCB

1	Shield
2	Data RxTx+
3	Data RxTx-
4	Ground (PAG)
5	Data Tx+
6	Data Tx-

Table 7.1 RS-485 host on upper PCB



1	TXD+
2	TXD-
3	RXD+
4	not connected
5	not connected
6	RXD-
7	not connected
8	not connected

Table 7.2 Ethernet Network socket (RJ45)

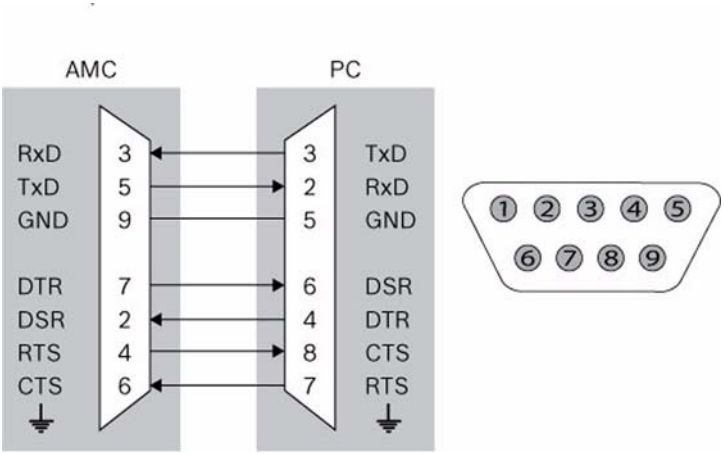


Figure 7.2 Interconnect diagram of the RS-232 serial interface

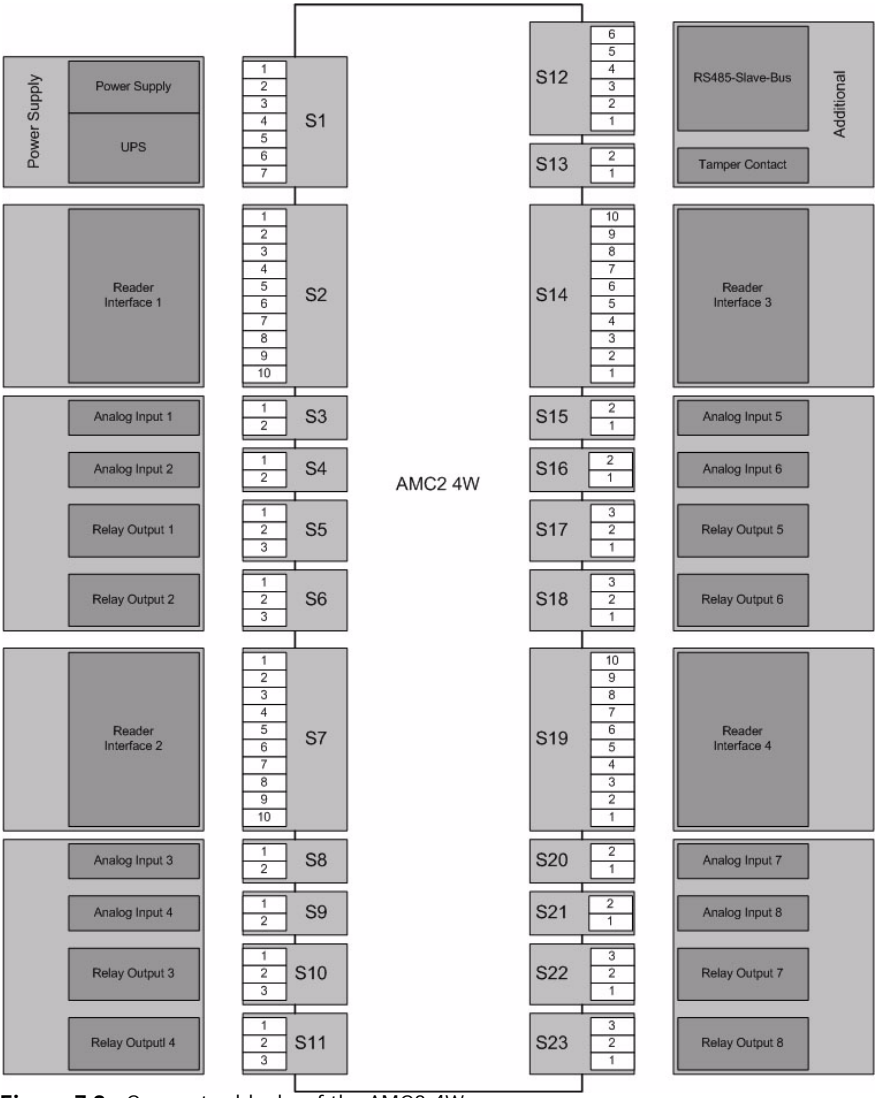
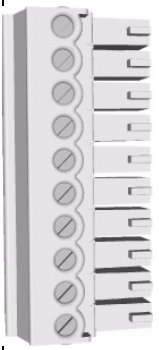


Figure 7.3 Connector blocks of the AMC2 4W

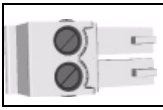
1	Power supply, DC positive (10V - 30V)
2	Shield
3	Power supply (0V)
4	UPS (power good signal) - AC
5	UPS (power good signal) - Battery
6	UPS (power good signal) - DC
7	UPS (power good signal) - Common

Table 7.3 Power supply



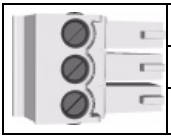
1	Reader Supply - 12V+
2	Reader Supply - 0V
3	Data 0
4	Data 1
5	Shield
6	green LED
7	red LED
8	Beeper
9	Hold
10	Card Present

Table 7.4 Wiegand interface



1	Analog Input, in
2	Analog Input, out

Table 7.5 Analog input



1	Relay Output, normally open
2	Relay Output, common
3	Relay Output, normally closed

Table 7.6 Relay output

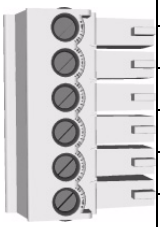
	1	Power supply for external devices - 12V
	2	Power supply for external devices - 0V
	3	Shield
	4	Data RxTx+
	5	Data RxTx-
	6	Ground (PAG)

Table 7.7 Extension interface

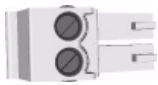
	1	Tamper Contact, in
	2	Tamper Contact, out

Table 7.8 External tamper contact

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